CLAIMS:

What is claimed is:

1. A device for normalizing the gas flow through multiple reaction vessels, comprising:

a plurality of reaction vessels, each of the plurality of reaction vessels having an inlet end and an exit end, the gas flow through each of the plurality of reaction vessels being adjustable, and each of the plurality of reaction vessels having a first gas flow rate; and

an adjustment mechanism operable for adjusting the gas flow through each of the plurality of reaction vessels to produce a second gas flow rate.

2. The device of claim 1, wherein the first gas flow rate exists when the plurality of reaction vessels are connected in parallel to a common gas feed with a fixed pressure, and is different for each of the plurality of reaction vessels.

3. The device of claim 1, wherein the second gas flow rate exists when the plurality of reaction vessels are connected in parallel to a common gas feed with a fixed pressure, and is substantially the same for each of the plurality of reaction vessels.

4. The device of claim 1, wherein each of the plurality of reaction vessels has appropriate supports for supporting a condensed phase material bed disposed within each of the plurality of reaction vessels, the gas flow through each of the plurality of reaction vessels being adjusted by varying the amount of condensed phase material composing the condensed phase material bed.

5. The device of claim 4, wherein the support for supporting the condensed phase material bed disposed within each of the plurality of reaction vessels is a sintered plug, a screen, a filter, a frit, a fibrous substance, or any other suitable porous structure or material.

6. The device of claim 4, wherein the condensed phase material bed is composed of a condensed phase catalyst or reagent suitable for catalytic or consumptive reactions, or any other suitable porous material.

7. The device of claim 1, further comprising a vacuum gauge operatively connected to the exit end of one of the plurality of reaction vessels, wherein the vacuum gauge is operable for measuring and displaying the pressure drop across the reaction vessel.

8. The device of claim 1, further comprising a gas flow controller operatively connected to a vacuum gauge, wherein the gas flow controller is operable for controlling the gas flow rate through each of the plurality of reaction vessels to produce a measurable first pressure drop reading on the vacuum gauge at a chosen gas flow rate and a measurable, predetermined second pressure drop reading within a predetermined range on the vacuum gauge at the chosen gas flow rate.

9. The device of claim 1, further comprising a controlled vacuum source operatively connected to a gas flow controller, wherein the controlled vacuum source is operable for providing a steady chosen gas flow through each of the plurality of reaction vessels.

10. The device of claim 1, further comprising a fitting sealingly connecting each of the plurality of reaction vessels, one at a time, to a vacuum source, the fitting having a support for mounting each of the plurality of reaction vessels and preventing gas leaks at the exit end of each of the plurality of reaction vessels.

11. The device of claim 10, wherein the fitting comprises a material providing a gas-tight seal.

12. The device of claim 1, wherein each of the plurality of reaction vessels is any shape that it capable of sealingly engaging a fitting connecting each of the plurality of reaction vessels to a vacuum source.

13. The device of claim 1, wherein each of the plurality of reaction vessels is any suitable material that is capable of providing an inert environment for gas-condensed phase reactions.

14. The device of claim 4, further comprising a means to agitate the reaction vessel and/or condensed phase material bed.

15. A method for normalizing the gas flow through multiple reaction vessels, comprising:

activating a controlled vacuum source to provide a steady gas flow;

sealingly connecting one of a plurality of reaction vessels with a first gas flow rate to the controlled vacuum source;

setting a gas flow controller to a gas flow rate to produce a measurable first pressure drop reading on a vacuum gauge at a chosen gas flow rate and a measurable, predetermined second pressure drop reading within a predetermined range on the vacuum gauge at the chosen gas flow rate;

adding an amount of at least one of a plurality of condensed phased materials to the reaction vessel with the first gas flow rate to produce the predetermined second pressure drop reading corresponding to a second gas flow rate; and

replacing the reaction vessel with each of the plurality of reaction vessels, in turn, and adding an amount of at least one of the plurality of condensed phase materials to each of the plurality of reaction vessels, each with a first gas flow rate, to produce the predetermined second pressure drop reading corresponding to the second gas flow rate.

16. The method of claim 15, wherein the first gas flow rate exists when the plurality of reaction vessels are connected in parallel to a common gas feed with a fixed pressure, and is different for each of the plurality of reaction vessels.

17. The method of claim 15, wherein the second gas flow rate exists when the plurality of reaction vessels are connected in parallel to a common gas feed with a fixed pressure, and is substantially the same for each of the plurality of reaction vessels.

18. The method of claim 15, wherein the predetermined second pressure drop and the predetermined second pressure drop range are dependent on such factors as the type of condensed phase materials being used and their porosity; the required range for the amount of catalysts or reagents for the reactions of interest; the required range for the gas flow rate required for the reactions of interest; the diameter of the reaction vessels being used; the measurement range of the vacuum gauge being used, experience with prior gas-condensed phase reactions; and any other similar factors.

19. The method of claim 15, wherein each of the plurality of reaction vessels has appropriate supports for supporting a condensed phase material bed disposed within each of the plurality of reaction vessels, the gas flow through each of the plurality of reaction vessels being adjusted by varying the amount of condensed phase material composing the condensed phase material bed.

20. The method of claim 19, further comprising agitating the reaction vessel and/or condensed phase material bed.

21. A device for normalizing the gas flow through multiple reaction vessels, comprising:

a plurality of reaction vessels, each of the plurality of reaction vessels having an inlet end and an exit end, the gas flow through each of the plurality of reaction vessels being adjustable, and each of the plurality of reaction vessels having a first gas flow rate, existing when the plurality of reaction vessels are connected in parallel to a common gas feed with a fixed pressure, wherein the first gas flow rate is different for each of the plurality of reaction vessels; and

an adjustment mechanism operable for adjusting the gas flow through each of the plurality of reaction vessels to produce a second gas flow rate, existing

when the plurality of reaction vessels are connected in parallel to a common gas feed with a fixed pressure, wherein the second gas flow rate is substantially the same for each of the plurality of reaction vessels.

22. The device of claim 21, wherein each of the plurality of reaction vessels has appropriate supports for supporting a condensed phase material bed disposed within each of the plurality of reaction vessels, the gas flow through each of the plurality of reaction vessels being adjusted by varying the amount of condensed phase material composing the condensed phase material bed.

23. The device of claim 22, wherein the support for supporting the condensed phase material bed disposed within each of the plurality of reaction vessels is a sintered plug, a screen, a filter, a frit, a fiber, or any other suitable porous structure or material.

24. The device of claim 22, wherein the condensed phase material bed is composed of a condensed phase catalyst or reagent suitable for catalytic or consumptive reactions, or any other suitable porous material.

25. The device of claim 21, further comprising a vacuum gauge operatively connected to the exit end of one of the plurality of reaction vessels, wherein the vacuum gauge is operable for measuring and displaying the pressure drop across the reaction vessel.

26. The device of claim 21, further comprising a gas flow controller operatively connected to a vacuum gauge, wherein the gas flow controller is operable for controlling the gas flow rate through each of the plurality of reaction vessels to produce a measurable first pressure drop reading on the vacuum gauge at a chosen gas flow rate and a measurable, predetermined second pressure drop reading within a predetermined range on the vacuum gauge at the chosen gas flow rate.

27. The device of claim 21, further comprising a controlled vacuum source operatively connected to a gas flow controller, wherein the controlled vacuum source

is operable for providing a steady chosen gas flow through each of the plurality of reaction vessels.

28. The device of claim 21, further comprising a fitting sealingly connecting each of the plurality of reaction vessels, one at a time, to a vacuum source, the fitting having a support for mounting each of the plurality of reaction vessels and preventing gas leaks at the exit end of each of the plurality of reaction vessels.

29. The device of claim 28, wherein the fitting comprises a material providing a gas-tight seal.

30. The device of claim 21, wherein each of the plurality of reaction vessels is any shape that it capable of sealingly engaging a fitting connecting each of the plurality of reaction vessels to a vacuum source.

31. The device of claim 21, wherein each of the plurality of reaction vessels is any suitable material that is capable of providing an inert environment for gas-condensed phase reactions.

32. The device of claim 22, further comprising a means to agitate the reaction vessel and/or condensed phase material bed.

33. A method for normalizing the gas flow through multiple reaction vessels, comprising:

activating a controlled vacuum source to provide a steady gas flow;

sealingly connecting one of a plurality of reaction vessels with a first gas flow rate, existing when the plurality of reaction vessels are connected in parallel to a common gas feed with a fixed pressure, to the controlled vacuum source;

setting a gas flow controller to a gas flow rate to produce a measurable first pressure drop reading on a vacuum gauge at a chosen gas flow rate and a measurable, predetermined second pressure drop reading within a predetermined range on the vacuum gauge at the chosen gas flow rate;

adding an amount of at least one of a plurality of condensed phased materials to the reaction vessel with the first gas flow rate to produce the predetermined second pressure drop reading corresponding to a second gas flow rate, existing when the plurality of reaction vessels are connected in parallel to a common gas feed with a fixed pressure; and

replacing the reaction vessel with each of the plurality of reaction vessels, in turn, and adding an amount of at least one of the plurality of condensed phase materials to each of the plurality of reaction vessels, each with a first gas flow rate, wherein the first gas flow rate is different for each of the plurality of reaction vessels, to produce the predetermined second pressure drop reading corresponding to the second gas flow rate, wherein the second gas flow rate is substantially the same for each of the plurality of reaction vessels.

34. The method of claim 33, wherein the predetermined second pressure drop and the predetermined second pressure drop range are dependent on such factors as the type of condensed phase materials being used and their porosity; the required range for the amount of catalysts or reagents for the reactions of interest; the required range for the gas flow rate required for the reactions of interest; the diameter of the reaction vessels being used; the measurement range of the vacuum gauge being used, experience with prior gas-condensed phase reactions; and any other similar factors.

35. The method of claim 33, wherein each of the plurality of reaction vessels has appropriate supports for supporting a condensed phase material bed disposed within each of the plurality of reaction vessels, the gas flow through each of the plurality of reaction vessels being adjusted by varying the amount of condensed phase material composing the condensed phase material bed.

36. The method of claim 35, further comprising agitating the reaction vessel and/or condensed phase material bed.